

# THE RADICAL TREATMENT OF CANCER OF THE RECTUM.<sup>1</sup>

WITH PARTICULAR REFERENCE TO THE VALUE OF INGUINAL COLOSTOMY.

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To the surgeon of to-day the study of carcinoma wherever found is one of peculiar interest and importance. With our present knowledge, the only treatment which offers relief from this disease is the operative, and with improved technique the field for operative interference is constantly widening, while the results are becoming more satisfactory. These facts, and the knowledge that cancer is becoming more and more frequent, are the incentives which tempt surgeons to attack the growth wherever and whenever it appears within reach of the knife.

Cancer of the breast, occurring as it does in an external part and in an organ which can be removed *in toto* without endangering life or causing a serious functional defect, affords the most promising results, and, except to bring all such cases to an earlier operation, it seems that no further advance can be made in the recognized treatment. Unfortunately, cancer of the rectum presents quite another set of conditions because of its hidden position and the anatomical and functional difficulties attending its complete eradication. However, the same principles are here in force, and it is to formulate the application of these principles that the records of the cases here presented have been collected and studied.

The cases at our disposal for this purpose are forty-six in number, all of which have been operated for the radical cure of cancer of the rectum, and in addition two cases of inguinal

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colostomy (one for cancer and one for syphilis of the rectum) in whom no rectal excision was done. Forty-four of the cases were operated on by various surgeons of New York City, seventeen in all, to whom I am indebted for the privilege of using their records,\* and six, including the two colostomy patients, came under the care of the writer during the past year.

The study of the cases has been carried on mainly from the stand-point of determining results, and, if possible, of ascertaining the line of treatment which promises the largest per cent. of cures with the least sacrifice of functional control.

With this in view, the following two principles of the operative treatment of cancer have been kept in mind as essential to a cure. First, that cancer can be cured by operation only when it is attacked in an early stage. Second, that cancer can be cured by operation only when the growth itself is removed in its entirety, and with it all the immediately surrounding cancer-bearing tissue and the lymphatic glands draining these regions.

The study of the cases with reference to an early diagnosis is most instructive, and gives rise to hope for marked improvement in the matter of an earlier attack against the disease as it occurs in the rectum. The average period which elapsed from the appearance of symptoms which might have led to a diagnosis to the time when a diagnosis was actually made was about nine months, the shortest time being one week and the longest two years, this period occurring five times. The reasons for this tardiness in discovering the true condition are several. In the first place, the growth usually occurs sufficiently high in the bowel not to give any external manifestation, or, in its early stage, to interfere with sphincteric action.

Further, the early symptoms of rectal cancer are in no way characteristic and do not differ from those of many benign

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lesions of this organ. In nearly every case the first symptoms were pain and bleeding from the rectum. Nor do constitutional manifestations appear early enough to be of value in forming a diagnosis at the proper time. An appreciable cachexia was present in only one-third of the cases even at the time of operation. Finally, a sentiment of modesty oftentimes deters the patient from fully reciting the symptoms present or from having the proper examination made. These all tend to delay, and not infrequently a patient is treated during a period of months for hæmorrhoids, fissure, or fistula, when a thorough examination would have revealed the true condition to be one of cancer. Several of the cases here reported gave such a history when finally they came under the care of the operating surgeon.

One case, No. 46 of the series, will illustrate this fact. A woman, aged twenty-six years, passed through a pregnancy, and was finally delivered at one of our hospitals. The delivery caused a laceration of the vagina and perineum through into the rectum for a distance of three inches. A month later she came under the care of the writer at the Lincoln Hospital to have this condition remedied. An examination showed the patient to be in an extremely cachectic condition and markedly septic. The perineal and rectal tears were foully infected, and a condition of complete incontinence existed, the region being filled with foul, purulent, fæcal matter. The parts were so excessively tender that no examination could be tolerated, and, after nearly a month's fruitless attempt to get them in a cleaner condition by antiseptic irrigations, an inguinal colostomy was done for this purpose. Examination showed that an encircling cancer of the rectum involving the vaginal wall was the true condition, and that this accounted for the pain and the sepsis. She had been under treatment nearly two years for some rectal trouble, and it must have been in existence when the child was born; yet it remained undiscovered.

Such cases emphasize the fact that the possibility of a rectal cancer must take a more prominent place in the minds of the profession at large, and that no fancied security against

the disease must be indulged in without a thorough examination. Mayo has formulated the principle that pyloric cancer to be successfully treated must be attacked before a positive diagnosis can be made in any less radical way than by an exploratory laparotomy. Accordingly, he advocates this procedure when one has good ground for *suspecting* the disease. This may be rather radical, but, severe as it is, the writer believes it would, if put into execution, lessen the suffering and mortality from cancer of the pylorus. An exhaustive examination of the rectum entails no such severity, and in the majority of cases can be performed in the office without an anæsthetic, and with no more inconvenience to the patient than is entailed in the giving of an enema.

It seems fair to say, therefore, that every patient who presents himself suffering from any symptom of lower bowel trouble is entitled to a thorough rectal examination, first digital, and, if this is negative, instrumental, with one of the proctoscopes now in general use. Only in this way can the diagnosis be made at a period when the hope of cure can be greatest. Youth is no guarantee against the disease, as five cases were less than thirty years old, the youngest being only twenty-three, and general statistics emphasize this point.

The accomplishment of the second principle in the bettering of results, namely, the complete eradication of the disease and the zone of danger surrounding it with their lymphatics, presents a far more difficult problem than the one just concluded.

The obstacles to this end are two. First, the anatomical and functional conditions of the rectum are such that the operative procedure itself is a dangerous one, and particularly liable to be followed by sepsis. Second, the destruction of the function of the rectum and anus to the degree needed for complete eradication of cancer is a matter of the utmost seriousness to the patient. The two obstacles are so closely related that the overcoming of one is apt to increase the other, and hence, in considering the best means to combat one, we must have constantly in mind the second.

In the present series of cases the operative mortality was 26 per cent., that is, 12 cases died as the direct result of the operation. An analysis of the causes of death shows that 7 cases, or 58½ per cent., died of sepsis in one form or another. Three cases died from the shock of the operation, and in two the cause was not given. Hupp, in the *Medical News*, September 28, 1901, with an analysis of 881 cases, quoting Krönlein, gives the mortality as 19.4 per cent. In the same article, with 171 cases analyzed for the cause of death, 83 just under one-half died from septic infection. Other observers put the proportion of death due to sepsis in some form at even a higher per cent., 60 to 70.

Severe as these percentages show the operation to be, we must acknowledge an even greater death-rate with our present technique, if an operative procedure is carried out which is radical enough to promise better permanent results, statistics now giving only 15 to 20 per cent. of cures. Our first consideration is to find a means then of lowering this mortality without sacrificing thoroughness. Earlier operation will do much in this direction, but a more important factor will be the elimination of sepsis. The cause of the infection is, of course, in the majority of cases, the contamination of the wound with faecal matter either during the operation or immediately subsequent to it. This can in a great measure be avoided, and hence the mortality should be decreased by nearly, if not quite, one-half. The more radical operation needed to insure the best hope of a permanent cure would, on the other hand, increase to a certain extent the death-rate from shock and allied conditions, but this would be slight as compared to the gain from the elimination of faecal infection.

How can this best be accomplished? The writer is strongly of the opinion that it can only be satisfactorily done by a complete deflection of the faecal current from the normal channel, that is, by the formation of a complete inguinal colostomy. Much may be gained by a thorough attention to getting the bowels in good condition and the rectum cleansed from its purulent discharge by a week's or more treatment to this

end. Regulation of the diet so as to leave the least residue, mild catharsis so as to empty the bowels in spite of the constriction of the growth, and rectal irrigation twice daily with hydrogen peroxide, potassium permanganate or creolin followed by saline solution, are the means best suited to this purpose. At best, however, these only do away with a certain amount of the infection during the operation itself, while in badly constricted cases they accomplish nothing, and do not in any case provide against the subsequent infection from the passage of feces over a fresh wound. It may be urged that in those cases where only a resection of a piece of the bowel is needed and an end-to-end anastomosis is done, the latter condition will not obtain because the anastomosis will be firm enough to prevent any leakage into the wound. Unfortunately, this is not true, because the union is not firm enough for this; and, moreover, this ideal method is applicable to only a very limited number of cases if a thorough eradication is obtained.

A frequent objection advanced against performing a preliminary inguinal colostomy is that this operation may interfere with the sufficient drawing down of the gut for the radical removal later to be performed. This objection carries no weight if the colostomy is done in such a way as to avoid it, which is a matter of easy accomplishment. In short, the preliminary colostomy accomplishes the end to be desired in a perfect manner, and is the only method that can accomplish it. Moreover, if indicated, the distal end of the artificial anus may be used for additional cleansing of the bowel during the time between its establishment and the rectal resection. Again, valuable information as to the extent of involvement of the rectum and pelvic organs may be obtained by exploration through the colostomy wound. Finally, this procedure is in most conditions followed by a marked general improvement of the patient during the convalescence, so that the three weeks which should intervene before the radical operation is done is a cause of gain more than enough to compensate for the loss of time in permitting an advance of the growth.

An equally important means of combating the development of sepsis is the exercising of the greatest care in avoiding contamination of the wound from the gut during the operation. The rectal caliber is never surgically clean, no matter what precaution and preparation are followed. This contamination can be accomplished by closing the bowel at the anus, and above and below any section of it by a purse-string suture, and then making the section with the actual cautery. It is difficult to say to just what extent this precaution is taken or neglected, but, judging from published articles and personal communications, it seems that its importance is not sufficiently appreciated.

The value of colostomy for the prevention of sepsis can be more definitely determined. In this series it was performed six times among those cases developing a serious sepsis, and nine times when no sepsis supervened. In nearly all of the fifteen cases, however, the colostomy was only a lateral anastomosis, and hence the requisite for protection of the wound, *i.e.*, complete deflection of the feces, did not obtain. Severe infection occurred in only one of the five cases when the colostomy was complete. Marked fouling of the wound was present with subsequent infection, and a varying grade of sepsis in nearly every case where the colostomy was not used.

In one case of the series, No. 41, it was not performed as a preliminary, but had to be done during the radical operation, to avoid the certain later contamination of the wound with feces because of inability to bring the gut flush with the sacral wound. In another, No. 45, where the ideal operation was performed, that is, resection of a segment with end-to-end anastomosis of the bowel, colostomy had to be done eight days later because the feces caused breaking down of the union, and a sepsis supervened which could be controlled in no other way. Both these cases made good ultimate recoveries, and the latter was shown as an example of functional control in an inguinal colostomy. It therefore seems established that, without a complete colostomy, infection of the posterior wound and a sepsis often fatal is the rule, while with it

these conditions do not obtain. Unfortunately, the forming of a complete colostomy is not entirely devoid of danger, a number of fatal cases being found in the literature, and the writer having lost two in the past. These last, however, were due to errors in technique, as most of them have been, and the mortality ought to be found to be very low with improved methods.

There still remains to be considered the means by which a greater number of cures may be obtained in those surviving the operation with the best possible retention of faecal control.

Of the 46 cases here reported, 44 were traced to their death or to the present time. A study of these shows a probable cure of about 16 per cent., counting freedom of return for three years as a cure. This conforms very closely to the statistics of all observers based on thousands of cases. The showing is not satisfactory, and we are justified in advocating new methods to improve it.

Our knowledge of cancer in general leaves only one means open for the obtaining of the best results as regards non-recurrence, namely, an operation which removes all cancer tissue, and with it all tissue which is liable to later cancer infection. The writer believes that this can be accomplished, except in the rarest instances, only by a removal of the rectum from well above the growth to and including the anal orifice, along with all lymphatic glands draining this area. In other words, the ideal operation, that is, preserving functional sphincters, is possible only in very rare cases.

The reasons for this belief are based upon the following facts:

First. In the majority of cases the growth is so situated that its lower border encroaches closely on the sphincters; hence it cannot be removed completely and leave behind a sufficient distal segment to which to attach the proximal end with the hope of a sphincteric control. In every case here reported the growth was easily within the reach of the finger, and the great majority were recorded as about two inches from the anus.



In other words, they were so situated that saving the anal segment was entirely out of the question, and it was unhesitatingly sacrificed. Statistics from various sources show that in more than half the cases a safe zone distal to the growth does not exist.

Second. Gerota has shown that the lymphatics draining the rectum are divided into four groups: 1. The anal skin; 2. The intermediate anal; 3. The columnar anal; 4. The group draining the rectum proper. Of these, group 1, that is the anal skin, drains both outward towards the thigh and inguinal glands and upward into group 3. The other three groups all drain upward, following in general the course of the superior hæmorrhoidal artery branches. The glands and vessels which are placed at first laterally thus become more and more posterior until they finally all drain into the glands occupying the sacral hollow nearly as high as the promontory between the converging leaves of the peritoneum, which is here forming the mesosigmoidea. It will be noted that even the anal margin has an anastomotic circulation of lymphatic vessels with this superiorly situated group, and so in cancer low down the sacral glands are a source of recurrence and should be removed.

This extensive distribution of lymphatics (Funke found that two-thirds of operative cases showed glandular involvement) necessitates a correspondingly extensive operation, and the intimate association of the various groups makes it imperative to remove them all, except the inguinal glands when these show no involvement. This can be accomplished satisfactorily only when no attempt to save the sphincters is made, and an amputation is done.

Third. The desire to save the lower segment, and thus keep the sphincter intact, often tempts the surgeon to leave more of the gut than his better judgment dictates, just as the desire to avoid the scar of engrafted skin may lead to a too close section in the case of mammary cancer. A frank abandonment of this hope except in rare cases will avoid falling into this error.

Fourth. It is commonly accepted that a constantly re-

curring irritation of a part which is liable to cancer development is an etiological factor in producing the neoplasm. An end-to-end anastomosis must inevitably produce some scar tissue with a certain amount of constriction as its sequela, and this in the tissue of an individual who has a cancer tendency and in a part which is subject to constantly recurring irritation. Statistics show that in most cases the recurrence takes place locally. In this series the per cent. is 100, every case that showed a return having the growth in or about the rectum.

It would therefore seem that the attempt to retain the anal portion even in high situated cancers is open to many objections, and that the results, so far as obtaining a cure is concerned, would be improved by sacrificing it. This opinion will probably be accepted without debate; but the question immediately arises as to whether the functional mutilation thus entailed justifies the end. In answering this, the first point to be considered is a comparison of this functional mutilation with that resulting from a less radical operation.

It has already been pointed out that considerably more than 50 per cent. of all rectal cancers are so situated that a saving of the sphincters is out of the question. In the remaining cases these muscles might possibly be saved as anatomical structures, but this does not mean functional integrity. The high situated cancers in which the sphincters are in the safe zone require a correspondingly high resection and complete removal of sacral glands and interstitial tissues. This means an extensive deep dissection which will surely to a greater or less extent damage the innervation of these muscles, and to this same extent impair fæcal continence. It is difficult to measure the degree of functional control present under such circumstances, but it is certain that often there is little. In this series not more than one or two cases so operated got a really good control of the bowels. Hence the chief objection (namely, the impairment of function) to the extirpation of the rectum from well above the growth to the skin becomes invalid, because this impairment is no greater than with a

less radical procedure, and the method has the great advantage of promising the surest immunity from recurrence.

The final problem to be solved is what substitute shall be made for the sphincters thus destroyed. Two accepted procedures are in use,—one, the sacral or perineal method, and the other, the inguinal method. The latter when properly performed seems to the writer to hold out the promise of giving the greatest functional control, and to this is added the advantage, already shown, of having the anus so situated, as a preliminary to the radical operation, in reducing the mortality of the latter.

A great advance has been made in recent years in so forming the colostomy that some satisfactory substitute for a sphincter shall result, and there are many cases on record in which patients with this condition have lived in comfort without interfering with their usual occupations.

It is not necessary to enter into a complete discussion of the various methods advocated. Suffice it to say that some form of intermuscular operation seems to offer the most favorable results.

Earlier diagnosis and a complete eradication of the growth, done after the following method, promises, then, the most satisfactory results both as regards permanency of cure and functional integrity.

An inguinal colostomy is first performed by drawing the sigmoid through an intermuscular incision just external to the left rectus muscle and dividing it between two ligatures. The point of division should be as low in the bowel as possible, thus leaving a large sigmoid pouch as a reservoir above the new anus. The distal end is closed and dropped into the pelvic cavity, or, if indicated, may be fastened in the lower angle of the wound for the purpose of through-and-through irrigation. In this case the lower segment must be left sufficiently long not to interfere with the radical excision to be done later.

An incision is then made in the linea alba at the same level as the intermuscular incision, or, better, slightly above it,

and the anterior sheath of the rectus between the two incisions raised up from the muscle. The proximal end of the gut with its mesentery is then drawn under this strong sheath over the rectus muscle, and fastened into the skin and fascia wound in the middle line. This opening must not be too small, because it shows a tendency to contract and form a stricture. The gut is tacked to the peritoneum where it emerges from the peritoneal cavity, and the skin and fascia wound is here closed. A protective dressing can be so applied as to insure almost complete primary union. It is well to insert a small catheter into the proximal gut for a distance of six or eight inches to facilitate the passage of gas during the first days following operation.

Three weeks later the radical amputation is done. The patient is put in the exaggerated knee-chest position, which controls to a remarkable degree the venous oozing, and an incision made from the third sacral vertebra downward to and around the anus. The anus is then tied with a purse-string suture, and the eradication of the growth and all the glands begun. The coccyx and one or two sacral vertebræ are resected, and the presacral tissues as high up as the second vertebra are pushed away from the bone, saving only the sacral nerves. This includes all the lymphatic glands and vessels which are apt to be infected.

Ligation of the superior hæmorrhoidal artery is next done, and then the gut is free posteriorly. It is now freed laterally and the peritoneum opened when reached. This permits the drawing down of the rectum even up to the blind end, or, if the end was fastened in the colostomy wound, well up towards that point. In the former case the whole lower segment will be removed; in the latter the gut is divided between two purse-string sutures with the actual cautery and the upper end closed. This technique obviates the leaving of a piece of bowel closed at both ends, a procedure which has been shown to be dangerous.

Beginning at the upper division, the gut to be removed is separated from its anterior and remaining lateral attachment

from above downward, and finally removed in one piece with all lymphatics and glands attached to it. The peritoneum is sutured, the closed end of gut, if present, being fastened in the opening, the wound closed, and a small drain put in it.

This method can be carried out with no faecal contamination to the wound, and, as Tuttle has pointed out, the starting above and working downward has the advantage of avoiding cutting through the infected lymphatic tissues. This advantage is analogous to the one of beginning the removal of breast cancer at the most distal lymphatic glands and working towards the growth in the mammary gland.

The detailed histories of the cases follow and the percentage statistics are tabulated.

CASE 1.—I. S., aged thirty-four years; female; white. New York Hospital, Dr. Bolton. Adenocarcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Began four months previous to operation with painful defecation and blood in stools. Experienced sharp pain in lower part of rectum. Marked loss of strength and fifteen pounds weight during past six months.

*Physical Examination.*—Rather anæmic, well-nourished woman. Local. Nearly impassable stricture of rectum three and one-half inches from anal opening, due to a mass palpable through vagina.

*Operation.*—February 9, 1904. Preliminary colostomy. Kraske-Sims position. Rectal irrigation; coccyx and small piece of sacrum removed; four inches of gut excised; end-to-end suture of gut. Hæmorrhage slight.

*Postoperative.*—Large amount of faecal discharge, February 12 to March 11. February 18, wound partly broken down.

Discharged May 14. Gained twenty pounds. Inguinal colostomy wound still open.

Present condition. February 16, 1905, has "pretty good" control over defecation (by way of artificial anus). Anal fistula does not close. Considerable gain in weight.

CASE 2.—M. K., aged forty-six years; female; white; housewife. Presbyterian Hospital, Dr. McCosh. Malignant adenoma.

*Family History.*—Negative for neoplasm.

*History.*—Nine months previous to operation patient noticed her stools were streaked with blood, which condition prevailed at intervals. Diarrhœa followed and became progressively more marked,—ten to twelve movements daily. Size of fæces gradually became smaller. Considerable rectal tenesmus. Loss of strength. Weight normal.

*Operation*, January 20, 1898.—Perineal incision. Coccyx removed. Distal ten inches of gut excised and proximal end sutured to a remaining one and one-half inches of gut at anus. Operation followed by rectal obstruction. Dilatation. Discharged improved, June 5, 1898. Died later.

CASE 3.—F. L., aged twenty-eight years; male; white. Presbyterian Hospital, Dr. Brown. Adenocarcinoma. (July 25, 1899.)

*Family History.*—Negative for neoplasm.

*History.*—Began four years previous to operation with pain in rectum and blood in the stools. Was operated on at that time for tumor of rectum. Passages were free. Since that time has been well until three months previous to present operation, when the pain returned. Pain is not severe, but annoying and remains after defecation. Movements are formed.

*Operation* (second).—July 25, 1899. Incision in median line of sacrum in old scar. Dense connective tissue found surrounding the rectum, divided, gut dissected out, drawn down, mass excised, end-to-end suture of gut.

Discharged cured, August 27, 1899. Died shortly after leaving the hospital.

CASE 4.—J. M., aged fifty-six; male; white; tailor. Presbyterian Hospital, Dr. McCosh. Carcinoma.

*Family History.*—Negative.

*History.*—Nine months previous to operation noticed blood in stools, which continued; fæces progressively grew smaller, to size of lead-pencil. Moderate pain. Six to eight stools daily.

*Physical Examination.*—Local. Hard, ragged mass on anterior rectal wall, one and one-half inches from sphincter.

*Operation.*—January 10, 1898. Perineal. Schleich No. 2 anæsthesia. Coccyx removed. Gland in left side of pelvis enlarged; removed. Hæmorrhage considerable; controlled by

sponges. Distal end of gut excised; perineal end sutured to skin. Silk sutures. Died, January 13, 1898.

CASE 5.—M. W., aged twenty-three years; male; white. New York Hospital, Dr. Hartley. Gelatinous carcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Bowels always regular and rather loose. Ten years ago was kicked in perineum, and thinks he noticed traces of blood in stools since then. One month previous to operation had tenesmus and constant desire to go to stool, but rarely passed any feces except after taking cathartic. Stools became pencil shaped, streaked with mucus and blood.

*Physical Examination.*—Tight ring one and one-half inches above anus; apparently similar ring one-half inch higher; considerable bleeding on examination.

*Operations.*—June 26, 1900. Stricture divided, July 20, 1900. Kraske, November 24, 1900. Incision in line of old scar. Cartilaginous constriction extending about gut, divided for two and one-half inches. Colostomy.

Discharged improved, January 10, 1901. Died about one year later.

CASE 6.—P. W., aged forty-two years; male; white; laborer. Bellevue Hospital, Dr. Tilton. Carcinoma recti.

*Family History.*—Negative for neoplasm.

*History.*—Enjoyed good health until five years previous to operation. One month previous to operation was so constipated that medicines of all kinds were taken without result.

*Physical Examination.*—Well nourished. Presence of hard nodular growth obstructing lumen of rectum.

*Operation.*—April 29, 1904. Exaggerated lithotomy position, hips raised. Incision, second sacral spine to one-half inch posterior to anus. Coccyx and sacrum to fourth foramen removed. Mass excised. Small sacral glands also. Proximal end of gut sutured to anal mucosa. Time, one and one-half hours.

*Postoperative.*—Bladder washings for cystitis.

Discharged, June 18, 1904.

March 15, 1905, still living and in good health. Has some control over bowels, but cannot keep clean through tendency to stricture contraction at anal orifice. This required cutting on March 7.

CASE 7.—J. M., aged sixty years; male; white; laborer.

Bellevue Hospital, Dr. Hartwell. Pathological report: Carcinoma. Inguinal glands not malignant.

*Family History.*—Negative for neoplasm.

*History.*—Six months previous to operation patient experienced pain at defecation, knife-like in character; later, this changed to a burning sensation lasting some hours after defecation. Four months previous to operation, noticed blood in the stools.

*Physical Examination.*—Cachectic. Hard, somewhat friable growth one and one-half inches above anus. Lumen of the gut obliterated. Inguinal glands involved.

*Operations.*—July 9, 1904. Inguinal colostomy by method of using anterior sheath of rectus and the rectus muscle in constructing sphincter. August 5, 1904. Knee-chest position. Kraske incision second sacral spine to one inch above anus, encircling it. Coccyx and two lower sacral vertebræ removed. Hæmorrhage, not severe, controlled by clamp and ligature. Mass excised between ligatures. Six inches of gut and anus removed. Proximal end closed. Sacral glands and areolar tissue removed. Wound closed with drainage.

*Postoperative.*—August 30. Primary union.

Discharged in six weeks.

March 22, 1905, has excellent control over inguinal anus, and his general condition is very satisfactory. No recurrence.

CASE 8.—F. S., aged sixty years; female; white; housewife. Presbyterian Hospital, Dr. Eliot. Malignant adenoma.

*Family History.*—Negative for neoplasm.

*History.*—Began two years previous to operation with painful defecation and straining at stool. (Constipated.) Pain continued two to three hours after action. Stools became small in size and coated with blood. Dull ache in sacrum and thighs. Eight months previous to operation stools still painful but not more frequent, size of lead-pencil. Loss of flesh.

*Physical Examination.*—Poorly nourished, anæmic, cachectic. Internal hæmorrhoids. At internal sphincter series of masses surrounding gut.

*Operation.*—December 12, 1900. Sims's position. Kraske operation. Glands not noted. Hæmorrhage controlled by sponge.

*Postoperative.*—Mental condition cloudy. Wound sloughing. December 19. Considerable faecal discharge. December 24.



Movements through posterior wound, not through anus. Movements involuntary. January 4. Bedsore of right trochanter. Sloughing. January 6. Died.

CASE 9.—A. M. R., Brooklyn; aged forty-nine years; female; white. New York Hospital, Dr. Murray. Carcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Habitual constipation, which grew worse with time. One month previous to operation was unable to introduce smallest size nozzle to secure enema. Slight pain one week previous to operation. Loss of strength, not of flesh. No hæmorrhage.

*Physical Examination.*—General condition good. Local. Nodular mass completely surrounding gut in region of sphincter.

*Operation.*—May 21, 1903. Lithotomy position. Perineal incision encircling the anus. Mass excised. Surrounding tissues involved (possibly some growth left). End of gut sutured to skin wound.

*Postoperative.*—Healing by granulation. Complete control of sphincter.

Discharged cured (improved), June 22, 1903. Died, January, 1905, after going to hospital for second operation.

CASE 10.—C. M., aged twenty-seven years; female; white; seamstress. Bellevue Hospital, Dr. Hartwell. Carcinoma.

*Family History.*—Negative.

*History.*—Pain and blood in stools for a few weeks only.

*Physical Examination.*—Some cachexia. Friable mass reaching around bowel two inches above anus.

*Operation.*—August 19, 1904. Simple complete colostomy.

*Postoperative.*—Complained of weakness daily.

*Operation.*—August 26, 1904. Preliminary irrigations through colostomy wound, August 29. Modified Kraske. Knee-chest position. Incision from second sacral spine to one-half inch posterior to anus. Lower part of sacrum (third foramen) and coccyx removed. External sphincter left. Four inches of gut excised, free end sutured to anal portion. Anæsthesia, three and one-quarter hours.

*Postoperative.*—Hot saline infusion. Catheterization. September 2. Irrational. September 4. Delirious; vomited greenish fluid. September 4. Coma. Died. Cause of death, shock and some sepsis, though no sloughing.

CASE 11.—A. W., aged fifty-eight years; female; white; housewife. Presbyterian Hospital, Dr. Briddon. Malignant adenoma, Dr. Thacher.

*Family History.*—Negative.

*History.*—Twelve years previous to operation patient had hæmorrhoids, which lasted for a few months and then disappeared. Nine months previous to operation pain was experienced in rectum, posteriorly, during defecation. Blood was occasionally noticed and caliber of stools became smaller. Loss of weight and appetite.

*Physical Examination.*—Neoplasm size of chicken's egg, just above internal sphincter.

*Operation.*—January 6, 1899. Prone position. Perineal and sacral incision with division of sacrum at third vertebra. Enlarged glands in adipose tissue. Rectum divided between clamps and growth excised. End-to-end suture of gut. Hæmorrhage controlled by clamp and ligature.

*Postoperative.*—Considerable amount of foul discharge from wound. Abdominal distention. Involuntary defecation and urination. Septic. Died January 10, 1899.

CASE 12.—F. N., aged fifty-eight years; male; white. New York Hospital, Dr. Weir. Carcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Began one year previous to operation with constipation, straining at stool, frequent passage of blood in stools. Two doctors diagnosed bleeding piles and gave medicine. No examination made. Patient became worse. Frequent desire to defecate resulting in no movement. Intense pain in back, groin, testicle, and penis. One month previous to operation diagnosis of carcinoma was made and patient sent to hospital.

*Physical Examination.*—Large mass two inches above anus extending entirely around gut.

*Operation.*—November 22, 1898. Colotomy. December 7, 1898. Incision of anus to third sacral foramen. Sacrum and coccyx excised. Six inches of gut excised, end-to-end suture of sigmoid to remaining two and one-half inches at anal extremity. Glands of rectum involved. Signs of shock during last twenty-five minutes of operation.

*Postoperative.*—Considerable fæcal discharge. Wound infected. December 10, 1898. Cheyne-Stokes breathing. December 11. Died,

CASE 13.—F. C. N., aged fifty-two years; male; white. New York Hospital, Dr. Weir. Carcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Noticed blood in stools, June, 1898. Some pain. Condition lasted seven days. January 1, 1899. Had sudden onset of cramps in left calf and thigh and pain in back and rectum. Constant feeling of distention and desire to defecate. Marked constipation. Much straining. Urination frequent.

*Physical Examination.*—Hard nodular bleeding mass encircling rectum as high as finger can reach and as low down as one inch from anus.

*Operation.*—February 25, 1899. Colostomy. March 11, 1899. Sims's position. Incision of anus to coccyx. V piece of sacrum and coccyx removed. Mass excised between ligatures of gauze. Suspicious adnexa removed. Hæmorrhage free, controlled with great difficulty. Patient in collapse. Died, March 12, 1899, from shock.

CASE 14.—I. J. M., aged thirty-seven years; female; white; actress. New York Hospital, Drs. Markoe and Hartley. Adenocarcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Pelvic peritonitis nine years previous to operation. Five years previous to operation suffered from abdominal pain. Operation, tube and ovary removed, Homœopathic Hospital, Buffalo. Similar attack, January, 1901. Operation, St. Mark's Hospital, New York City. Abdominal incision, drainage through vagina. Vaginal sinus persisted. June, 1901. Temperature and abdominal pain; went to Homœopathic Hospital, Buffalo; treatment, antiphlogistine poultices to abdomen; result, sinus opened, which has persisted. Discharge fecal at times from abdominal sinus.

*Physical Examination.*—Well nourished, moderately anæmic. Grayish facies (cachexia?). Posterior fornix occupied by indurated mass.

*Operation.*—December 11, 1901. Dr. Markoe. Abdominal incision. Mass behind uterus dissected out. January 22, 1902. Dr. Hartley. Abdominal fluid and gelatinous material evacuated.

Complication. Bronchopneumonia. Died April 21, 1902.

CASE 15.—T. H. B., aged thirty-three years; male; white. New York Hospital, Dr. Hartley. Carcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Began four months previous to operation with pain in region of rectum; was treated for hæmorrhoids. Pain at times sharp and shooting. Constipation. No notice of decrease of weight.

*Physical Examination.*—General condition good. Local: Mass four inches from anus attached around lumen of gut. Not adherent to bladder.

*Operation.*—June 29, 1901. Sims's position. Incision from median line of sacrum to anus; coccyx removed. Mass excised, end-to-end suture of gut. Sterile gauze.

*Postoperative.*—Pulse weak and rapid. Skin cold (shock?). Died June 30, 1901.

CASE 16.—M. R., aged fifty-three years; female; white. New York Hospital, Dr. Johnson. Carcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Was always well and strong until eight months previous to operation. At that time experienced an uncomfortable sensation about the anus and in pelvic region. For two months previous to operation was very constipated, movements impossible, pain severe. Hæmorrhages from rectum just previous to operation, also a bloody discharge from the vagina. Loss of flesh and strength.

*Physical Examination.*—General condition good. Vaginal: Near outlet of floor of vagina a hard, ulcerating mass, vagina freely movable over it. Rectal: So indurated and occluded that finger cannot pass.

*Operation.*—July 23, 1903. Perineal incision—right of centre—from vagina to anus, encircling it. Tumor extended up rectum for two and one-half inches. Rectum pulled down, tumor excised, and gut sutured to skin wound. Posterior wall of vagina sutured to free edge of skin at anterior portion of perineal wound.

*Postoperative.*—July 26. Chills. Temperature, 106.6° F.; pulse, 140; respirations, 32. Involuntary defecation. August 1 to 5. Delirious. Complication, nephritis. Died August 8, 1903, probably from sepsis.

CASE 17.—W. F., aged fifty-two years; male; white. Presbyterian Hospital, Dr. Woolsey. Epithelioma.

*Family History.*—Negative for neoplasm.

*History.*—(Syphilis and rheumatism.) For three to four

years previous to operation had lumps about the anus, which were painful and disappeared on treatment. For past year lumps have been permanent, are painful, bleed on defecation. For eight months previous to operation had a discharge of yellow fluid continuously.

*Physical Examination.*—Poorly nourished, anæmic. Inguinal glands somewhat enlarged, prostate not enlarged. Mass on right side of rectum size of chestnut, surface uneven. No enlarged glands in pelvis.

*Operation.*—July 15, 1900. Lithotomy position. (Hæmorrhoids excised.) A circular incision was made about the anus. Mass pulled down and excised. Skin sutured to mucous membrane over the area. Gauze drain. Time, thirty minutes.

Discharged cured, July 25, 1900. Alive and well, March 1, 1905. Has satisfactory control over bowel. No return of symptoms.

CASE 18.—J. S., aged forty-nine years; male; white; laborer. Presbyterian Hospital, Dr. Briddon. Adenocarcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Eight months previous to operation patient noticed blood in stools, but had no pain. Two months later he experienced a dull, heavy pain in rectum, more marked at night. Bowels constipated. No diminution in caliber of stools. No cachexia. Some loss of flesh, more loss of strength.

*Physical Examination.*—No cachexia. Hard ulcerated tumor, size of almond, felt on left rectal wall, one inch from anus, involving sphincter. Prostate enlarged.

*Operation.*—October 18, 1899. Lithotomy position. Perineal incision, distal three inches of gut excised, proximal end sutured to skin incision. Sphincter muscles cut in removing the growth. Hæmorrhage severe, controlled by clamp and ligation.

*Postoperative.*—October 20. Suprapubic cystotomy. November 6. Catheter inserted for continuous drainage of bladder. Delirium lasting over one month.

Discharged January 31, 1900. Died February, never having regained any control over sphincter ani.

CASE 19.—A. M., aged fifty-three years; female; white; housewife. Presbyterian Hospital, Dr. Brown. Malignant adenoma (colloid).

*Family History.*—Negative for neoplasm.

*History.*—Began six months prior to operation with diarrhœa and occasional passage of blood and pus in stools. For two months previous to operation desire to defecate has been almost constant. Movements are painful and difficult. Fæces passed in small round balls. Difficult to start stream in urination.

*Physical Examination.*—Patient fairly well nourished. No enlargement of superficial glands. Local: Nodular mass extending two-thirds around rectum on left side.

*Operation.*—September 4, 1900. Prone position. Hips raised. Median incision sacrum to anus. Sacrum and coccyx excised, rectum excised, artificial anus below site of excised sacrum. No infiltration of surrounding tissue. Time, two hours.

*Postoperative.*—Free purulent discharge from wound for over a month. Pain in wound. No control over bowel.

Discharged cured, November 1, 1900. Died January 9, 1902, never having regained any control over bowels.

CASE 20.—J. M. M., aged forty-seven years; male; white; electrician. Presbyterian Hospital, Dr. Eliot. Adenocarcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Nine months previous to operation had severe fall, striking coccyx on stone steps. Six months previous to operation patient noticed obstruction in rectum and traces of blood in stools. Later movements became ribbon shape, and after movements experienced a dull aching pain. Three weeks previous to operation stream of urine became gradually smaller and urination more frequent.

*Physical Examination.*—Weight has increased, no enlarged glands. Well nourished. Local: Had immovable fungating mass just within anal margin, size of plum; three inches higher up a firm annular stricture.

*Operation.*—October 17, 1900. Prone position. Sacral flaps (Kraske). Growth adherent to bladder. Rectum divided four inches from anus. Free end sutured to upper outer angle of wound.

*Postoperative.*—Discharge from wound abundant. Urinary fistula. Incontinence of urine and fæces.

Discharged cured, December 22, 1900. Readmitted to hospital, March 9, 1901. Rectovesical fistula. Incontinence of urine and fæces. Physical examination: Well nourished, not anæmic,

no glands. Discharged improved, March 16, 1901. Died October, 1901, never having any control over defecation.

CASE 21.—J. C. G., aged fifty-nine years; male; white. New York Hospital, Dr. Hartley. Adenocarcinoma.

*Family History*.—Negative for neoplasm.

*History*.—Nine years previous to operation injured spine in railroad accident. Two years previous to operation had itching and bleeding piles. Constipation marked. Loss of flesh and strength. Few months previous to operation passed blood and pus in stools. Stools became smaller in caliber. Urination difficult.

*Operation*.—June 2, 1898. Lithotomy position. Perineal incision from coccyx to anus. Coccyx removed. Hæmorrhage considerable. Growth adherent to tissues. Mass excised, free end sutured to skin wound. Artificial anus.

*Postoperative*.—Semiconscious, delirium, pain in abdomen. Died June 12, 1898.

CASE 22.—G. C. M., aged sixty-three years; male; white; driver. Presbyterian Hospital, Dr. McCosh. Carcinoma.

*Family History*.—Negative for neoplasm.

*History*.—About ten months previous to operation patient began to suffer from an indefinite pain in the abdomen, followed by frequent and painful defecation; eight to ten movements in twenty-four hours; rectal tenesmus marked. Loss of sphincteric control with involuntary defecation and urination.

*Physical Examination*.—Local: Carcinomatous mass three inches from anus; apparently no glandular involvement.

*Operation*.—December 13, 1898. Preparatory treatment, diet and stimulation. Combined operation with sacral flap and division of sacrum at fourth interspace. Upper end of rectum involved in carcinomatous mass. Mass excised. Lower end of sigmoid sutured to upper border of skin wound. Lower end of gut clamped. Iodoform gauze drain. Hæmorrhage considerable, controlled by clamps.

*Postoperative*.—Considerable discharge from posterior wound; dark green and foul smelling. Patient died, December 15, 1898, with wound in septic condition.

CASE 23.—M. E. C., aged forty-four years; female; white. New York Hospital, Dr. Hartley. Adenocarcinoma.

*Family History*.—Negative for neoplasm.

*History.*—Colotomy, June, 1897, after suffering from condition one year. (Thought to be inoperable at time of colotomy.)

*Physical Examination.*—Cauliflower mass two inches beyond anus encircling entire gut.

*Operation.*—November 15, 1898. Semiprone position. Median incision sacrum to anus. Sacral flap. Surrounding tissues infiltrated. Mass excised, end-to-end suture of gut. Time, one hour, thirty-five minutes.

*Postoperative.*—Considerable discharge from wound.

Discharged improved, January 1, 1899. "Was well enough after operation to attend reception. Had constant pain, but bowels were under comparative control. Dropsy, January 5, 1900." Died January 5, 1900.

CASE 24.—C. H., aged thirty-five years; female; white; housewife. Presbyterian Hospital, Dr. McCosh. Adenocarcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Nine months previous to operation passed blood at stool. Five weeks later, while at stool, had a piercing pain in rectum; painful and bloody defecation since; caliber of fæces not diminished.

*Physical Examination.*—Health has been as good as usual. Corpulent, anæmic. Area of ulceration size of silver dollar two inches above external sphincter. No stricture.

*Operation.*—April 2, 1898. Lithotomy position. Perineal incision. Coccyx resected. Distal six and three-quarters inches of gut excised. Proximal end sutured to anal site. Glands in surrounding tissues involved. Hæmorrhage considerable, controlled by clamp and sponge. Gauze drain. Foul purulent rectal discharge for days following operation. Pain in abdomen and about anus. Painful defecation and urination.

Discharged May 5, 1898. Died July 22, 1899. The control over bowels was never regained.

CASE 25.—L. M. W., aged thirty-four years; male; negro; dyer. Presbyterian Hospital, Dr. McCosh. Malignant adenoma.

*Family History.*—Negative.

*History.*—One year previous to operation noticed blood and mucus at stool. Pain and tenesmus followed one month after initial symptoms, with constant desire to defecate. Loss of weight and strength.



*Physical Examination.*—Poorly nourished, weak. Epitheliomatous growth, with cauliflower formation involving lower four inches of rectum, adherent to bladder and prostate. Inguinal colotomy, October 8, 1896.

*Operation.*—November 5, 1896. Perineal incision. Part of prostate and enlarged glands removed, ten inches of rectum excised. Artificial anus: rectum stitched to posterior skin incision. Very vascular, controlled by sterile dressing. November 28. Dejecta from artificial anus.

December 10. Discharged cured. Doing well. Died April 25, 1897. The functional control was never good.

CASE 26.—J. R., aged thirty-five years; male; white; butler. New York Hospital, Dr. Murray. Colloid carcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Operation for tumor of rectum, St. Luke's Hospital, February, 1897. Was well until April, 1898, when he reverted to condition previous to operation. Marked flatulence, great constipation, digestion poor, pain on defecation, stool hard, scybalous, streaked with blood and mucus. Had medical attention with diagnosis. "Catarrhal proctitis." Loss of strength and twenty-five pounds weight.

*Physical Examination of Rectum.*—Posterior and to left indurated, flat, rough growth, reached by finger.

*Operation.*—September 10, 1898. Sacrum diseased, operation discontinued. September 17, 1898. Lithotomy position. Incision anus to coccyx. Four inches of gut excised. Artificial anus at upper angle of wound. Anus sewed up.

*Postoperative.*—November 4. Posterior sinus healed.

Discharged improved, November 8, 1898. Temporarily improved; condition recurred. Died, 1899.

CASE 27.—J. M., aged forty-five years; female; white; milliner. Bellevue Hospital, Dr. Tilton. Carcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Began eight years previous to operation with pruritus and pain about anus. Unable to sleep at night. Ten days previous to operation had bloody discharge. Excessive pain on and after defecation. Constant stinging pain. Micturition painful.

*Physical Examination.*—General: A little emaciated and haggard.

*Operation.*—September 29, 1904. Sphincter ani dilated. "Lower two inches of rectum together with hard tumor removed. Hæmorrhage stopped. Skin and mucous membrane fastened together by black silk."

*Postoperative.*—October 3. Considerable discharge from wound. October 22. Slight discharge from wound.

Discharged December 11, 1904. Has fair control over bowel. Has recently experienced shooting pain in rectum.

CASE 28.—M. R., Brooklyn; aged forty-seven years; female; white. New York Hospital, Dr. Hartley. Adenocarcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Began two years prior to operation with pain on defecation and bloody discharge from the rectum. Pain lately increased in severity, becoming constant in coccyx and thighs.

*Physical Examination.*—Fairly well nourished. Local: Ring of papillomatous growths constricting the lumen three inches above the anus.

*Operation.*—January 6, 1903. Modified Kraske. End-to-end suture of gut.

*Postoperative.*—Discharge of fluid and mucus. Complication, colitis.

Discharged cured, February 22, 1903. Recurrence about July, 1904, and admitted to Presbyterian Hospital, in Dr. Woolsey's service.

*Physical Examination.*—General: Poorly nourished. Rather pale, slightly cachectic. Tubercular involvement of left upper lobe and slight of right upper lobe of lungs. Local: Nodular growth of lower end of rectum, above which is a cicatricial stricture of previous operation. Rather lax sphincter.

*Operation.*—August 31, 1904. Position, left lateral. Coccyx exposed and removed. Tumor removed. Perforation in the rectum closed with catgut. Drain inserted. Good condition.

*Postoperative Condition.*—Wound over the sacral region healed clean. Pain completely relieved. Sphincteric action weak but improving.

Discharged September 18, 1904.

March 15, 1905. Still living and in very fair condition. Has very good sphincteric control.

CASE 29.—W. P., aged twenty-seven years; male; white; boiler-maker. Presbyterian Hospital, Dr. McCosh. Adenocarcinoma.

*Family History.*—Negative.

*History.*—Bleeding from rectum and pain on defecation for two years. No history of cachexia.

*Physical Examination.*—Ulcerated mass felt on the wall of rectum low down. Glandular involvement not mentioned.

*Operation.*—June 6, 1895. Lithotomy position. Gut pulled down, stitched to skin, and end excised (four inches). Gauze drain inserted. Hæmorrhage easily controlled by sponges. Condition of patient good.

*Complications and Sequelæ.*—Considerable pain, relieved by morphine. Pain on micturition. Wound discharged pus, mucus, and blood. Urinary fistula into rectum.

Discharged cured, June 28. Function good. Recurrence within two months. Second operation, August 20, 1896. Discharged cured, September 7, 1896.

March, 1905.—Patient at work. Has gained forty pounds in weight. Control fair. Longest period of cure recorded in this series.

CASE 30.—M. J., aged thirty-nine years; female; white; laundress. New York Hospital, Dr. Markoe. Adenocarcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Began eight months previous to operation with blood in stools. Condition became worse from month to month. Three months previous to operation had difficulty in moving her bowels. For two months previous some pain, not severe. Alternate attacks of constipation and diarrhœa. Had three attacks of obstruction, vomiting, pain. Relieved when bowels moved.

*Physical Examination.*—Well nourished, obese. Local: Mass on anterior rectal wall (ulcerating) one and one-half inches in diameter.

*Operation.*—January 20, 1903. Prone position. Sacral flap. Mass excised, one inch from growth, three-quarters from anus. End-to-end suture of gut. Hæmorrhage moderate, shock marked.

Discharged cured, March 5, 1903. Not heard from since.

CASE 31.—B. R., aged fifty-six years; female; white. New York Hospital, Dr. Stimson, Dr. Johnson. Adenocarcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Began two years previous to operation with difficulty at stool. Fæces passed in small particles, accompanied by blood and bearing-down sensation. Dull ache in rectum before defecation. Frequency of defecation; improved under treatment. Loss of strength and twenty pounds weight.

*Physical Examination.*—Moderately well nourished, skin and mucous membrane of good color. Local: Indurated, raspberry-like mass encircling gut two inches from anus; no ulceration; no glandular involvement.

*Operation.*—October 31, 1903. Prone position. Median incision. Excision of coccyx, sacrum, and gut containing tumor; end-to-end suture of gut.

Discharged cured, December 28, 1903.—“Granulations have tendency to be sluggish.” Recurrence; returned to hospital.

*Physical Examination.*—General condition good. Robust, complexion ruddy. Local: Large mass encircling rectum one and one-half inches deep.

*Operation.*—May 23, 1904. Dr. Johnson. Mass excised. Rectum sutured to sacral end of skin wound.

Discharged, improved, June 13, 1904.

Has been in bed over four months, cannot sit up because wound pains her so. Wound does not heal. Has no control over bowel. No return noticeable. Has suffered since operation with la grippe, dysentery, and dyspepsia.

CASE 32.—A. B., Brooklyn; aged forty-nine years; female; white; seamstress. New York Hospital, Dr. Bolton. Carcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Habitual constipation. Four months previous to operation, experienced painful defecation. Constipation severe; soon after blood in stools; stools small. Lost twenty pounds. Indigestion marked.

*Physical Examination.*—Anæmic. Local: Ulcerated rough area close to anus constricting gut.

*Operation.*—August 7, 1901. Sims's position. Kraske. Sphincter and anus excised, coccyx removed; gut, including mass (six inches), excised. End of gut twisted and sutured to wound. Hæmorrhage slight.

*Postoperative.*—Discharge yellow, odor strong.

Discharged cured, September 25, 1901.

Patient doing fairly well; weighs twenty-five pounds more

than before operation. Discharge from wound still present. No control over defecation.

CASE 33.—L. D. G., aged forty-four years; male; white. New York Hospital, Dr. Weir. Adenocarcinoma.

*Family History*.—Negative for neoplasm.

*History*.—Two months previous to operation began to have dull aching pain at defecation, with passage of small amounts of blood in stools. No loss of flesh or strength. Bowels regular.

*Physical Examination*.—Ulcerated, indurated mass one inch above anal margin, extending up two and one-half inches, involving one-third circumference of rectal wall.

*Operation*.—Colostomy, April 25, 1898. May 12, 1898. Sims's position. Median perineal incision. Lower three inches of rectum excised. Free end sutured to upper angle of skin wound.

*Postoperative*.—Artificial anus, May 28, 1898. Discharged, improved, June 30, 1898. Not reported later.

CASE 34.—I. C., aged fifty-five years; male; white; engineer. Presbyterian Hospital, Dr. Eliot. Carcinoma.

*Family History*.—Negative for neoplasm.

*History*.—Good health until one month previous to operation; became very constipated. Used Sal Rochelle, Liq. Mag. Cit., Castor Oil, and enemata with but little result. By persistent catharsis had two or three stools during the month. Stools were fluid (otherwise not noted). Considerable prostration.

*Physical Examination*.—Well nourished, not anæmic. Mass on right side of rectum can be touched by finger; limits not definable.

*Operation*.—Previous colotomy, July 24, 1898. September 7, 1898. Sims's position. Sacral flap, with division of sacrum between fourth and fifth segments. Mass size of small orange removed (four inches above anus). End-to-end suture of gut.

*Postoperative*.—Considerable discharge from wound of pus and mucus. Healing by granulation. Belladonna and opium suppositories for pain. Discharged cured, October, 1898.

Died March 18, 1900, from pneumonia. Never regained control over bowels.

CASE 35.—M. M., aged seventy years; female; white; housewife. Presbyterian Hospital, Dr. Briddon. Malignant adenoma.

*Family History.*—Negative for neoplasm.

*History.*—Began one year previous to operation with constipation, straining and pain at stools. Considerable loss of weight and strength.

*Physical Examination.*—Well nourished. Small cauliflower growth size of walnut projecting from anus; another smaller mass two inches from sphincter.

*Operation.*—September 29, 1897. Lithotomy. V-shaped incision including anus and vulva as high as meatus urinarius. Posterior vaginal wall involved in mass. Inguinal glands not enlarged. End of gut excised. Wound closed with silkworm gut. Hæmorrhage moderate. Discharged cured, October 15, 1897. Function good.

Admitted June 7, 1900, to Home for Incurables.

*Physical Examination.*—Hard mass in rectum occluding lumen.

Died November 3, 1900, from recurrence.

CASE 36.—C. S., aged sixty-seven years; female; white. New York Hospital, Dr. Bolton. Adenocarcinoma.

*Family History.*—Negative for neoplasm.

*History.*—More or less dysentery for last sixteen years. For a few years previous to operation alternated with constipation, and noticed a small amount of blood in stools. Four or five months previous to operation had considerable bearing-down pains, particularly when bowels moved. Severe hæmorrhage one week before operation. Some loss of weight and strength.

*Physical Examination.*—Poorly nourished, anæmic. Local: On posterior wall, one inch from anus, is a tumor projecting forward three-quarters of an inch, surface uneven, ragged, firm consistency, one and one-half by two inches. No glandular enlargements felt.

*Operation.*—August 10, 1901. Sims's position. Median incision from anus upward. Elliptical area bearing tumor removed. Cut edges of rectum and sphincter joined. Wound through skin left open. Hæmorrhage slight.

*Postoperative.*—Uneventful. Discharged cured, September 29, 1901.

Alive and well, February, 1905. Has perfect control over action of bowels.

CASE 37.—J. D., aged fifty-two years; male; white; laborer.

New York Hospital, Dr. Murray. Adenocarcinoma—rectum and glands.

*Family History.*—Negative for neoplasm.

*History.*—Began about nine months previous to operation with blood in stools. One month after passage of blood had pain in the hips, pain constant and “bursting” in character. Pain and amount of blood in stool increased with time. More diarrhœa than constipation. Became too weak to work. Lost twenty pounds in two and a half months.

*Physical Examination.*—Alcoholic, emaciated. Inguinal glands enlarged. Rectal: Just within the anus, extending up two and one-half inches, an ulcerating growth involving one-half circumference of gut; edges hard.

*Operation.*—Preliminary colostomy, March 29, 1904. April 9, 1904. (a) Incision encircling anus; coccyx removed, mass excised, wound closed with deep suture. (b) Inguinal glands of right side excised. May 9, 1904. Excision of metastatic inguinal gland on right side, under cocaine. Discharged, improved, May 30, 1904.

February 15, 1905. In Metropolitan Hospital, described as “having lumps breaking out on legs.” One leg much swollen. There is a general recurrence in pelvis. Has very fair control through colostomy anus.

CASE 38.—J. W., aged forty-three years; married; male; white; bartender. Presbyterian Hospital, Dr. Woolsey. Malignant adenoma.

*Family History.*—Negative.

*History.*—Always very constipated, two to three days. No neoplasm elsewhere. Blood in stool two months before admission (July 4, 1901), only with defecation, no pain. One month, pain with defecation localized in rectum, not referred, bleeding with and without defecation, amount increasing. No obstruction. Can only urinate after defecation.

*Physical Examination.*—General: Fairly well nourished, somewhat anæmic, otherwise negative. Local: Uneven villous-like growth just within sphincter all over rectum except left side. Seems continuous with prostate on right. Right lobe of prostate nodular and firm. Tumor hard, bare, infiltrated, smooth, irregular, not tender.

*Operation.*—September 11. (Inguinal colostomy, September

4.) Position right lateral. Coccyx and sacrum at level of third foramen removed. Much hæmorrhage. Rectum freed and resected from between external and internal sphincters to an inch above growth. Peritoneum stripped up. Silk retention sutures passed through proximal end before cutting slit in posterior surface of rectum. Sponges inserted. Rectum cut. Fat and lymph nodules cleaned from pelvis. Proximal end sutured by mucous membrane to anus, connective tissue to sphincter. Wound packed with gauze. Rectum closed at colostomy wound by gauze in distal end. Condition good.

*Postoperative.*—Bowels moved by colostomy wound on third day, by anus on sixth day. Sutures separated and rectum retracted two inches by the fourteenth day. Sacral wound closed clean by granulation at end of four months. Complications, attack of diarrhœa with pain on two occasions. Fæcal discharge from sacral wound for many weeks following operation. Discharged January 14, 1902, with occasional fæcal discharge from colostomy wound, and granulating sinus one inch deep and three-quarters by one-half inch, through which about one-half fæcal matter is discharged. Gained ten pounds in weight.

March 1, 1905. The sacral wound and rectal opening have entirely healed, so that all movements come through the colostomy wound. He has very fair control over this. It shows a tendency to stricture, which is controlled by bougies passed once a week.

CASE 39.—M. C., aged forty-five years; male. Bellevue Hospital, Dr. Woolsey. Pathological Report, Adenocarcinoma.

*Family History.*—No malignancy.

*History.*—For more than a year prior to operation he had pain due to fissure. For six months pain had been severe, and he had noticed blood in stools. There was no loss in weight or strength and no impairment of general health.

*Physical Examination.*—November 28, 1904, general condition good. Local: A fissure in ano is present. At finger length up in rectum there is a growth (nature of this not noted). December 1, 1904. Lateral colostomy.

*Operation.*—December 28, 1904. Incision over sacrum, coccyx, and into perineum. Coccyx and left side of third lower sacral vertebra removed. Rectum freed and three inches, including growth, resected. End-to-end suture, leaving anal sphincter intact.



*Postoperative.*—Wound badly fouled with faeces, marked sloughing. Retraction of sutured gut and gaping of wound. March 15, 1905, still in hospital. Has involuntary defecation through both wounds. Posterior wound not yet healed.

CASE 40.—W. R., aged sixty-nine years; male; white; painter. Presbyterian Hospital, Dr. McCosh. Pathological Report, Adenocarcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Hæmorrhoids to a certain extent. Six months ago (April 16) first noticed involuntary watery discharge from anal orifice, no blood nor pain. One week ago blood in stools. Examined by physician. Ulcer of rectum. Operation advised. No loss of weight, pain or bladder disturbance.

*Physical Examination.*—General: Well nourished and in good health. Local: Prostate enlarged. On posterior wall an irregular projecting cauliflower-like mass extending into lateral walls in crescentic manner, firm. Examining finger returns bloody.

*Operation.*—No previous colostomy. October 20, modified Kraske. Sims's position (on right side). Removal of coccyx and lower half of sacrum. Hæmorrhage free but not excessive, peritoneum not opened. Involved glands and fat removed. Six inches of rectum removed. Proximal end sutured to upper end of wound. Large drainage-tube inserted. Time, one hour, ten minutes. Condition excellent.

*Postoperative.*—Bowels constipated by Pil. Opii. Wound dressed on second day, clean. Considerable oozing. Bowels moved on seventh day. Catheterized for thirty days. No cystitis.

General progress excellent, gained in weight and flesh. Discharged December 3. Sacral wound nearly closed; granulating area three-quarters of an inch deep.

March 1, 1905. No recurrence. Has no faecal control and is very despondent, threatening suicide. Sacral sinus still persists.

CASE 41.—W. I., aged seventy years; male; white; mason. Presbyterian Hospital, Dr. McWilliams. Pathological Report, Adenocarcinoma.

*Family History.*—Negative for cancer.

*Previous History.*—Negative for rectal conditions.

*Initial Symptoms.*—Three years ago (1901) noticed some

blood in stools, soon followed by constipation, requiring constant catharsis. Without cathartic goes three or four days, but constant desire. At times a pint of clotted blood. No pain, vomiting, or bladder trouble. Gradual increase in bleeding and constipation. Fifty pounds lost in three years.

*Physical Examination.*—General: Obese and florid, otherwise negative. Local: One finger's length above anal orifice a hard, crater-like mass in posterior wall, slightly movable, friable, seems attached to sacrum. Markedly encroaching on lumen of rectum. No glands felt.

*Operation.*—June 22, 1904. Quarter grain morphine before operation. Position, knee-chest. Removal of coccyx and one inch of sacrum. Total resection of rectum, burned through with cautery. Hæmorrhage moderate, controlled by clamps and hot saline. Proximal end could not be drawn down, so was closed with plain gut and dropped back into wound, which was packed with gauze and rubber tube. Lateral inguinal colostomy.

*Postoperative.*—Sacral wound suppurated profusely, discharge foul and fæcal. Upper sutures did not hold. Considerable bloody oozing. Colostomy wound in good condition. Sphincteric action poor. Had to be catheterized first thirty-six hours. Later, occasional fæcal discharge through sacral wound. After first week a septic temperature, profuse purulent discharge from sacral wound. At end of one and a half months from operation patient is still discharging some fæcal matter from sacral wound. September 30, 1904. Secondary colostomy, by intermuscular method; with band of external oblique fascia as constricting sphincter, completely cutting off portion of gut distal to colostomy opening. Following this the sacral wound healed in rapidly by granulation. No more fæcal discharge. Discharged, December 17, with an imperfect sphincteric action of colostomy and small granulating area in sacral wound. General condition good.

March 15, 1905. He is in good health, and enjoys good control over the action of the colostomy anus. There is a tendency to contraction of the skin orifice around the gut end. This is corrected with bougies.

CASE 42.—J. K., aged forty-four years; male; German; was admitted to the French Hospital, Dr. Peck, May 29, 1897, with a history of pain on defecation dating back fifteen months. Later, constipation, blood in stools, loss of flesh and strength; for six

months unable to sit in chair on account of pain. For fourteen days prior to admission had had no passage of faecal matter or gas; intense pain and continuous vomiting for several days. Abdomen was greatly distended and tense, pulse rapid and feeble, expression anxious, skin cool and cyanotic. Large constricting neoplasm of rectum felt about four inches from anus.

Inguinal colostomy by lateral adhesion performed immediately (May 29, 1897); patient rallied rapidly, and insisted on an operation for removal of the growth in spite of an unfavorable prognosis.

Kraske's operation performed July 16, 1897, with removal of three and one-half inches of bowel and several very much enlarged sacral glands. About one inch of anal portion of gut preserved and upper segment sutured to it; sphincter divided posteriorly. Wound healed with very moderate sepsis, although the colostomy opening failed to divert the faecal current from the lower bowel; some of the posterior stitches gave way.

Plastic operation to close posterior defect in rectum, October 27, 1897, partially successful, final result being very fair sphincteric control, with only from two to four evacuations daily.

Closure of inguinal colostomy by suture February 17, 1898; healing by primary union. Condition quite comfortable for nearly two years; local recurrence, quite extensive, noted July 31, 1899; marked pain and cachexia noted October 27, 1899; cachexia progressive, and severe pain from then to death, three years after the radical operation. The closure of the colostomy opening on February 17, 1898, was permanent, and there was never any return of obstruction.

CASE 43.—K. D., aged thirty-nine years; female. Presbyterian Hospital, February 10, 1905, Dr. McCosh. Adenocarcinoma.

*Family History.*—Negative for neoplasm.

*History.*—Troubled with bleeding from hæmorrhoids(?) for fifteen years. During three months prior to operation she suffered pains in rectum and increasing constipation. No bleeding during this time.

*Physical Examination.*—General condition good, showing no cachexia. Local: There is a rough, indurated mass two and one-half inches up, infiltrating the posterior and right rectal wall; upper limit not determined.

*Operation.*—No preliminary colostomy. Sims's position on right side. Incision downward from lower sacrum over coccyx into perineum. Examination showed sphincters could not be saved. Lower sixth of rectum was amputated, end sutured to upper angle of wound. An attempt to pass bowel through gluteus failing because of difficulty in bringing it down.

*Postoperative.*—Wound became fouled with feces. Gut tore away and retracted two inches. Patient was quite septic for three weeks. Had no control over movements. At present, March 16, one month after operation, there is a large granulating cavity in sacral region, with rectum two inches deep in it, from which involuntary defecation takes place. General condition good.

CASE 44.—S. R., aged forty-eight years; male; colored. Lincoln Hospital, Dr. Hartwell. Carcinoma.

*Family History.*—Tubercular; no malignancy.

*History.*—In 1899 he had an ischiorectal abscess which healed without treatment. Recurred in 1901, and was operated on. Shortly after this he began to suffer from some rectal tenesmus and incontinence, which have grown continually worse. For some months past there has been a purulent discharge from the rectum, and his general condition has failed. During the past month he has lost thirty-five pounds in weight. His general condition on admittance to the Lincoln Hospital on May 9, 1904, was poor. He was very anæmic and moderately emaciated. Rectal examination showed an indurating tumor which encroached on the sphincter and extended upward, involving the greater part of the rectal wall for a distance of three inches. The sphincteric control was completely lost, and the growth apparently had its origin in the tract of the old abscess.

*Operation.*—May 23, 1904. Colostomy. Intermuscular method, proximal end beneath anterior sheath of rectus muscle and out at midline. Distal end sutured in primary wound. Healed kindly. Had fair control over movements. General condition improved.

June 21, 1904. Exaggerated knee-chest position. Incision from lower sacrum downward surrounding the anus. Resection of coccyx and one-half sacral segments. Rectum closed below. Freed from its bed, dissected off prostate and bladder and drawn out about eight inches. Amputated between two ligatures and proximal end closed. Wound partly sutured and drained with gauze. Shock very moderate.

June 29, the wound healed kindly with very little discharge. Patient gradually lost strength, however, and died from lack of power to react, a condition often noted in colored patients. There was neither local nor general evidence of sepsis.

CASE 45.—J. E., aged thirty-seven years; male. Lincoln Hospital, Dr. Lambert. Carcinoma.

In June, 1903, began to suffer from increasing constipation and pain about rectum. In the summer of 1904 blood appeared in stools. Entered Lincoln Hospital, October 20, 1904.

*Physical Examination.*—Some emaciation. Rectal: A finger's length from the anus there is a constriction, which just admits tip of finger and due to an indurating growth involving entire wall and circumference of rectum. October 27. Radical removal of the growth through a perineal incision with splitting of the anus, but without removal of the sphincter. About eight inches of rectum was resected and the proximal end sutured to anal margin; wound then partly closed with drainage.

November 4. Failure of union in sutured gut. Fouling of whole wound with feces. General condition of sepsis. To correct these conditions, an inguinal colostomy was done by intramuscular method, using rectus muscle and its anterior sheath as a sphincter. Following this the sacral wound cleared and healed kindly.

March 22, 1905. He is in excellent condition. He has very fair control over movements through colostomy anus, and is gaining constantly in this respect. Is filling position as engineer in large factory.

CASE 46 is reported in full in record of cases presented at the New York Surgical Society, for which see page 275.

#### SUMMARY AND CONCLUSIONS.

Number of cases, 46,—26 males, 20 females. Youngest, 23 years; oldest, 70 years (2 cases).

In the third decade, 5 cases; in the fourth decade, 9 cases; in the fifth decade, 14 cases; in the sixth decade, 11 cases; in the seventh decade, 5 cases; in the eighth decade, 2 cases.

*Results.*—Died from operation, 12 cases, or 26 per cent., 7 dying from infection, *i.e.*, 58 per cent. of all the deaths.

Died from recurrence in less than two years and more

TABLE OF

Number. Name. Operator. Hospital.	Age.	Sex.	Histological Structure.	Nature of First Symptoms and Duration of Disease.	Local Condition.	Cachexia.	Inguinal Colos- tomy.
No. 1. I. S. Dr. Bolton, New York.	34	F.	Adenocar- cinoma.	Bleeding and pain; 4 months.	Nearly impassable stricture $3\frac{1}{2}$ inches from anus.	No.	Lateral.
No. 2. K. Dr. McCosh, Pres- byterian.	46	F.	Malignant adenoma.	Bleeding, diarr- rhoea; 9 months.	Not stated.	.....	No.
No. 3. F. L. Dr. Tilden Brown, Presbyterian.	25	M.	Adenocar- cinoma.	.....	.....	.....	No.
No. 4. J. M. Dr. McCosh, Pres- byterian.	56	M.	Carcinoma.	Bleeding, increas- ing diarrhoea and pencil stools; pain. 9 months.	Hard, ragged mass on anterior wall, $1\frac{1}{4}$ inches from anus.	.....	No.
No. 5. M. W. Dr. Hartley, New York.	23	M.	Gelatinous carcinoma.	Tenesmus, mild bleeding, consti- pation, diarrhoea, 1 month; history of perineal trauma 10 years previous, followed by bleeding.	Tight ring $1\frac{1}{2}$ inches from anus. Second ring $\frac{1}{2}$ inch higher. Bleeding free from exami- nation.	.....	Lateral (?) for obstruction at suture site, 3 months after radical opera- tion.
No. 6. P. W. Dr. Tilton, Belle- vue.	42	M.	Carcinoma clinically.	Constipation pro- gressing over period of 5 years.	Hard, nodular growth obstruct- ing rectal lumen.	No.	No.
No. 7. J. M. G. Dr. Hartwell, Bellevue.	60	M.	Carcinoma.	Pain for 6 months; bleeding. 4 months.	Hard, friable growth, $1\frac{1}{2}$ inches from anus. Lumen much constricted. Inguinal glands enlarged and hard.	Yes.	Complete, with both ends in parietes. Prox- imal end be- neath sheath rectus.
No. 8. F. S. Dr. Eliot, Presby- terian.	60	F.	Malignant adenoma.	Pain and difficult defecation for 2 years; bleeding.	Internal hæmorr- hoids. Hard nodules surround- ing gut at internal sphincter.	Yes.	No.
No. 9. A. R. Dr. Murray, New York.	49	F.	Carcinoma.	No symptoms ex- cept constipation, which was habit- ual until 1 month prior to opera- tion, when ob- struction to enema nozzle was noted.	Nodular mass com- pletely surround- ing gut in region of sphincter. Ex- trarectal tissue involved.	No.	No.
No. 10. C. M. M. Dr. Hartwell, Bellevue.	27	F.	Carcinoma.	Bleeding and pains for few months.	Encircling, friable mass 3 inches from anus. Caliber gut nearly occluded. Bleeds easily. Up- per limit not reached.	Marked.	Complete as to temporary anus. Both ends in wound.
No. 11. A. W. Dr. Briddon, Presbyterian.	58	F.	Malignant adenoma.	Pain and bleeding, 9 months; hæm- orrhoids 12 years ago.	Tumor size hen's egg above internal sphincter.	.....	No.
No. 12. R. H. Dr. Weir, New York.	58	M.	Carcinoma.	Bleeding and pain, constipation; 1 year. Treated for hæmorrhoids.	Large mass 2 inches above anus extend- ing entirely around gut.	.....	Lateral 2 weeks prior to resec- tion.

CASES.

Type of Radical Operation.	Postoperative History.	Result and Time in Hospital.	Late Results.	Remarks.
Sacral route. 4 inches resected. End-to-end suture.	Faces through both ant. Suppuration and sepsis.	Lower wound granulating; 3 months.	1 year general condition good. Fair function through colostomy. Anal fistula open.	Had second operation, nature not known.
Perineal route. Removal coccyx. 10 inches resected. End-to-end suture 1½ inches up.	Contraction caused stricture. Dilated.	"Improved;" 4½ months.	Died. Date not determined.	The course of wound healing is not given.
Sacral route. Resection and end-to-end suture.	.....	Healed; 1 month.	Died soon after leaving hospital.	Recurrent operation. The first 4 years earlier. Details not known.
Perineal route. Coccyx resected. Amputation of distal segment, proximal sutured to perineum.	.....	Died on third day.	.....	.....
Kraske. 3 months later division of recurring stricture and colostomy.	Slowly granulating sacral wound.	Discharged improved in 3 months.	Died short time later.	Recurrence was evidently early.
Sacral route. Resection rectum at site of growth and sutured the proximal end to anal mucous membrane. Sacral gland removed.	.....	Healed. Left hospital in 3 months.	Alive and healthy at present, 11 months after operation. Bowels under partial control, though often involuntary. Stricture at gut union which required section 1 week ago. Bowels less controlled since.	Note tendency to stricture when anus is so arranged as to give fair control.
4 weeks later sacral route. Amputation, 6 inches, including anus, glands and areolar tissue removed <i>en masse</i> ; end sutured and dropped in pelvis.	Primary union except at drain point. No suppuration.	Complete healing in 4 weeks. Discharged in 1 month.	8 months, no return. Colostomy with excellent control.	Inguinal gland removed for examination showed no cancer.
Kraske method.	Marked suppuration and sloughing.	Died in 3 weeks from chronic sepsis and inanition.	.....	Very advanced case in patient of poor resistance.
Perineal method. Amputation, including anus. Gut sutured to skin. Some growths left in soft parts (?).	Clean healing by granulation.	Discharged in 1 month. Healed.	Died from recurrence in 22 months. Excellent sphincteric control.	Note control in absence of muscles.
Sacral route 10 days later. 4 inches of gut resected, leaving sphincters. Proximal end to anal by suture. Much shock.	Rested poorly. Progressive weakness. Only slight suppuration, but evidence of sepsis.	Died in 6 days without any good reaction after operation. Sepsis to some extent.	.....	Patient showed poor resistance after colostomy. Radical operation done too soon after colostomy.
Sacral route. Resection with end-to-end suture.	Much infection in wound. Peritonitis (?).	Died on fourth day from sepsis.	.....	.....
Sacral route. 6 inches resected, saving sphincter. End-to-end suture.	Much fecal leakage in wound.	Died on fourth day probably from shock and sepsis.	.....	.....

TABLE OF

Number, Name, Operator, Hospital.	Age.	Sex.	Histological Structure.	Nature of First Symptoms and Duration of Disease.	Local Condition.	Cachexia.	Inguinal Colostomy.
No. 13. F. N. Dr. Weir, New York.	52	M.	Carcinoma.	Bleeding and pain; 9 months.	Hard, nodular, bleeding mass encircling rectum from 1 inch above anus as high as finger can reach.	.....	Yes. 16 days before resection.
No. 14. I. M. Dr. Markoe, Dr. Hartley, New York.	37	F.	Adenocarcinoma.	.....	Large mass on rectum on Douglas's pouch.	Yes.	No.
No. 15. T. B. Dr. Hartley, New York.	33	M.	Carcinoma.	Pain, constipation. Treated for hemorrhoids; 4 months.	Mass 4 inches from anus attached around lumen of gut.	No.	No.
No. 16. M. R. Dr. Johnson, New York.	53	F.	Carcinoma.	Discomfort and increasing rectal obstruction for 9 months.	Rectum completely occluded just above sphincter by mass which bulges into vagina.	No.	No.
No. 17. W. F. Dr. Woolsey, Presbyterian.	52	M.	Epithelioma.	Syphilitic. Specific ulcers around anus for 4 years.	Mass in right anterior rectum size of chestnut. Surface uneven, growth superficial.	Moderate.	No.
No. 18. J. S. Dr. Briddon, Presbyterian.	49	M.	Adenocarcinoma.	Bleeding and pain; 1 year.	Hard, indurated tumor 1 inch from anus on left rectal wall. Sphincter involved. Large prostate.	.....	No.
No. 19. A. M. Dr. Briddon, Presbyterian.	53	F.	Malignant adenoma.	Bleeding, pus, diarrhoea; 6 months.	Nodular mass extending two-thirds around rectum on left side.	.....	No.
No. 20. J. M. Dr. Eliot, Presbyterian.	47	M.	Adenocarcinoma.	Obstruction to defecation, bleeding; 6 months.	Hard, fixed, fungating mass just above anus size of plum. 4 inches from anus a hard, annular stricture, adherent to bladder.	No. Well nourished.	No.
No. 21. J. G. Dr. Hartley, New York.	59	M.	Adenocarcinoma.	Old history of hemorrhoids. Constipation, free bleeding, pus several months.	.....	Yes.	Lateral.
No. 22. J. M. Dr. McCosh, Presbyterian.	63	M.	Carcinoma.	Diarrhoea, tenesmus, involuntary faeces.	Mass 3 inches from anus.	?	No.
No. 23. M. C. Dr. Hartley, New York.	44	F.	Adenocarcinoma.	Suffered 1 year, then colostomy as palliative.	Cauliflower mass 2 inches from anus encircling entire gut.	.....	Lateral 17 months before resection as palliative.
No. 24. C. H. Dr. McCosh, Presbyterian.	35	F.	Adenocarcinoma.	Bleeding and pain; 9 months.	Area of ulceration size of silver dollar 2 inches above external sphincter. No stricture.	No.	No.
No. 25. L. M. Dr. McCosh, Presbyterian.	34	M.	Malignant adenoma.	Bleeding and mucous discharge, 1 year; pain; 11 months.	Cauliflower growth over 4 inches of rectum above anus adherent to prostate and bladder.	Yes.	Yes.



CASES—Continued.

Type of Radical Operation.	Postoperative History.	Result and Time in Hospital.	Late Results.	Remarks.
Sacral route. Resection. Marked shock and hemorrhage.		Died on following day without reaction.		
Abdominal route. Mass removed.	Had recovered in one month. Second operation for removal failed to heal.	Died in 3 months. Fecal sinus remaining open.		Probably primary in pelvic tissue following extensive adnexa inflammation.
Coccyx removed. Perineal route. Resection growth. End-to-end anastomosis.	Did not react well.	Died following day from shock.		
Perineal route. Amputation of lower 5 inches of gut. End sutured in skin.	Extensive fouling of wound with feces. Much suppuration and general sepsis.	Died in 16 days from sepsis.		Marked extra-rectal involvement, but growth was entirely removed.
Excision of mass and suture of mucous membrane above to skin. Sphincter not removed.	Healed promptly.	Discharged in 10 days.	Well after 33 months. No return of growth. Complete control of bowels.	Growth was in mucous membrane only. Similar tumor clinically had healed with mixed treatment.
Perineal incision. Resection of 3 inches of bowel and gut sutured to skin.	Much infection. Cystitis. Healing fair.	Discharged in 3½ months. Healing incomplete and involuntary defecation.	Died 4 months after operation. Never really recovered. No sphincter action.	
Sacral route. Amputation of lower part of rectum. End sutured in sacral wound.	Wound infected. Suppuration marked.	Discharged in 2 months. No control over bowel.	Recurrence in 4½ months. Died in 16 months. No control over bowels regained.	Lived 1 year after recurrence was noted.
Sacral route. Amputation of 4 inches of rectum. End sutured to upper angle wound.	Fecal fouling of wound. Urinary fistula developed. Suppuration.	Discharged in 2 months, having incontinence of feces and urine.	Died in 12 months without regaining any control over sphincter. Confined to bed all the time.	Growth evidently involved outer coats of bladder.
Perineal route. Coccyx removed. Excision lower end of rectum. End sutured to skin.	Shock. Sepsis? Abdominal pain.	Died on tenth day from sepsis probably.		
Sacral route. Resection segment of rectum. Proximal end sutured in sacral wound. Lower segment clamped.	Marked fouling of wound. Free suppuration.	Died on 23d day from shock and sepsis.		Hemorrhage very severe, so that patient's condition prevented end-to-end closing of rectum.
Sacral route. Mass resected. End-to-end anastomosis.	Considerable discharge from wound.	Discharged in 6 months with wound in good condition.	Died in 13½ months. Control over bowels fair. Could attend to social duties. Developed dropsy before death.	Growth considered inoperable when colostomy was done. Radical removal 17 months later. Lived 13 months more, i.e., 30 months after colostomy.
Coccygeal and perineal route. 6¾ inches amputated. Proximal end sutured to skin. Glands involved.	Wound became contaminated with feces. Slow in healing.	Discharged in 5 weeks. Wound still open. Incontinence of feces.	Died in 15 months. Never regained control over bowels. Died from asthenia. Recurrence not known.	
Perineal route. Amputated 10 inches of rectum. End sutured into skin wound.	Posterior wound healed kindly.	Discharged in 6 weeks. Colostomy anus open. Control not mentioned.	Died in 6 months, "never having recovered."	Colostomy apparently prevented infection in lower wound.

TABLE OF

Number. Name. Operator. Hospital.	Age.	Sex.	Histological Structure.	Nature of First Symptoms and Duration of Disease.	Local Condition.	Cachexia.	Inguinal Colos- tomy.
No. 26. J. R. Dr. Murray, New York.	35	M.	Colloid car- cinoma.	Bleeding, pain, con- stipation; dura- tion not given.	Posterior and to left hard, flat growth just reached by finger.	Yes.	No.
No. 27. J. M. D. Dr. Tilton, Bellevue.	45	F.	Carcinoma.	Old history of pru- ritis ani; bleeding only 10 days prior to operation.	.....	Moder- ate.	No.
No. 28. M. R. Dr. Hartley, New York; Dr. Brown, Pres- byterian.	47	F.	Adenocar- cinoma; recurrence same.	Bleeding and pain; 2 years.	Ring of villous growths constrict- ing lumen 3 inches from anus.	No.	No.
No. 29. W. P. Dr. McCosh, Presbyterian.	27	M.	Adenocar- cinoma.	Bleeding and pain; 2 years.	Ulcerated mass on left side low down.	No.	No.
No. 30. M. J. Dr. Markoe, New York.	39	F.	Adenocar- cinoma.	Bleeding 8 months; partial obstruc- tion for 4 months.	Ulcerating mass on anterior rectal wall $1\frac{1}{2}$ inches in diameter.	No.	No.
No. 31. B. R. Dr. Stimson, New York.	56	F.	Adenocar- cinoma.	Bleeding, pain, ir- regular action of bowels; 2 years.	Hard mass encir- cling gut 2 inches from anus. No ul- ceration.	Moder- ate.	No.
No. 32. A. B. Dr. Bolton, New York.	49	F.	Carcinoma.	Habitual constipa- tion; pain and bleeding; 4 to 3 months.	Ulcerated, rough area close to anus, constricting gut.	Moder- ate.	No.
No. 33. L. D. G. Dr. Weir, New York.	44	M.	Adenocar- cinoma.	Pain and bleeding; 2 months.	Ulcerated, hard mass from 1 to $3\frac{1}{2}$ inches from anus over one-third bowel circumfer- ence.	No.	Yes, as prelim- inary.
No. 34. I. C. Dr. Elliot, Presby- terian.	55	M.	Carcinoma.	Constipation al- most complete, ex- tending over only 1 month. No oth- er symptom.	Mass on right side of rectum just reached by finger.	No.	Yes, lateral, 6 weeks prior to radical opera- tion to relieve obstruction.
No. 35. M. M. Dr. Briddon, Presbyterian.	70	F.	Malignant adenoma.	Constipation and pain; 1 year.	Small cauliflower growth projecting from anus. Sec- ond mass 2 inches from anus.	No.	No.
No. 36. C. S. Dr. Bolton, New York.	67	F.	Adenocar- cinoma.	Diarrhoeal tenden- cy for several years prior to op- eration. Occa- sional bleeding. Pain marked; 4 months.	Tumor on posterior wall 1 inch from anus. $\frac{3}{4}$ inch thick by $1\frac{1}{2}$ and 2 inches, ragged, firm.	Yes.	No.

## CASES—Continued.

Type of Radical Operation.	Postoperative History.	Result and Time in Hospital.	Late Results.	Remarks.
Coccygeal and perineal route. 4 inches of gut amputated. End sutured to angle of wound.	Healing rather prompt and without much suppuration.	Discharged in 7 weeks. Wound healed and condition good.	Growth recurred in few months, and he died in less than a year.	Very extensive condition. Growth had been removed year prior to this operation, but not radically. Benign (?) Sacrum was involved at time of radical operation.
Sphincter split. Lower 2 inches of rectum amputated together with growth. Gut sutured to skin.	Healed with very little suppuration.	Discharged in 10 weeks with complete healing of wound.	Good condition at present, 6 months. Fair sphincteric control, though cannot retain feces when desire to defecate arises.	
Kraske. Resection of piece and end-to-end suture.	Wound healed well and anastomosis united.	Discharged in satisfactory condition in 6 weeks.	Recurrence in 18 months, control having been "fairly good." Recurrence at site of anastomosis. Excised through old sacral wound. Healed kindly. Has fair sphincter control, 26 months after first resection.	Whole history extends over 3½ years. Now has tuberculosis.
Perineal route. 4 inches amputated. End sutured to skin.	Considerable suppuration, but healed well.	Discharged in 1 month with good control.	Growth recurred in 2 months. Excised second time 14 months after operation. Alive and well with good sphincter action after 9 years and 8 months.	Note prompt recurrence and successful removal with permanent cure.
Sacral route. Resection about 3 inches. End-to-end anastomosis.		Discharged cured in 11 weeks.	Not heard of after that.	
Sacral route. Resection. End-to-end anastomosis.	Wound healed slowly and incompletely.	Discharged in 6 weeks.	Recurred locally in few months. Excision; lower end of gut sutured to skin. Living, but in poor condition; involuntary evacuations. 9 months later confined to bed because of weakness and pain.	
Kraske. Amputation 6 inches of lower rectum. End twisted and sutured to skin.	Some fouling of wound. Healing, however, satisfactory.	Discharged in 7 weeks. Wound not entirely healed.	In good condition at present, 3½ years later. No sphincter control. Sinus in sacral region still present.	
Perineal route. 3 inches of rectum excised. End sutured to upper angle wound.		Discharged "improved" in 6 weeks. Colostomy functioning.	Not reported after leaving hospital.	
Sacral flap. Resection of mass size of small orange 4 inches up. End-to-end anastomosis.	Infection of wound and free suppuration. Healed by granulation.	Discharged in 6 weeks.	Died of pneumonia (?) 18 months later. No sphincter at anus. Condition at colostomy not noted.	Note lack of sphincteric control even at high resection.
Vaginal and perineal route. Post-vaginal wall and lower end of gut excised. Gut sutured in wound.	Healing satisfactory.	Discharged in 1 month. Function good.	Recurrence locally 33 months later, from which she died 38 months after excision.	Note good function cure with no anal muscles.
Posterior incision. Growth excised by elliptical incision. Wound in gut closed and sutured to sphincter. Later not disturbed.	Satisfactory. No difficulty in healing.	Discharged in 7 weeks.	Alive and well at present, 4½ years later. Has complete control.	Note permanent cure with comparatively slight operation.

TABLE OF

Number. Name. Operator. Hospital.	Age.	Sex.	Histological Structure.	Nature of First Symptoms and Duration of Disease.	Local Condition.	Cachexia.	Inguinal Colo- tomy.
No. 37. J. D. Dr. Murray, New York.	52	M.	Adenocar- cinoma.	Bleeding, pain, di- arrhea; 9 months.	Just within anus and up for 2½ inches, ulcerating, hard growth, in- volving one-half gut circumference.	Moder- ate.	11 days prior to radical opera- tion, intermus- cular complete colostomy done.
No. 38. J. W. Dr. Woolsey, Presbyterian.	43	M.	Malignant adenoma.	Habitual constipa- tion. Bleeding and pain; 2 months.	Uneven, villous-like growth just within sphincter, nearly surrounding rec- tum.	No.	Lateral, 1 week prior to radi- cal operation.
No. 39. M. C. Dr. Woolsey, Bellevue.	45	M.	Adenocar- cinoma.	Pain and bleeding for 6 months. Di- agnosed as fis- sure.	Growth high up in rectum. Fissure also present.	No.	Lateral, 1 month prior to radical opera- tion.
No. 40. W. R. Dr. McCosh.	69	M.	Adenocar- cinoma.	Loss of fecal con- trol, 6 months. Bleeding and pain; 1 week.	Irregular, cauliflower mass ex- tending over pos- terior half of rectal wall above pro- state. Bleeds easily.	No.	No.
No. 41. W. J. Dr. McWil- liams, Presby- terian.	70	M.	Adenocar- cinoma.	Bleeding, constipa- tion, about 2 years.	Finger's length up is hard, crater-like growth on poste- rior rectal wall. Seems adherent to sacrum.	No.	Lateral at time of radical op- eration be- cause end could not be drawn into wound. Inter- muscular later, with both ends lower segment closed.
No. 42. J. K. Dr. Peck, French.	44	M.	Typical car- cinoma.	Pain and constipa- tion for 1 month. Bleeding for over 6 months.	Large, constricting, tumor 4 inches from anus. Com- plete obstruction for 14 days.	Yes.	Lateral to re- lieve obstruc- tion. Closed by operation 10 months later.
No. 43. K. O. Dr. McCosh, Presbyterian.	39	F.	Adenocar- cinoma.	Hæmorrhoids 15 years. Pain and increasing con- stipation; 3 months.	Rough, indurated mass 2½ inches from anus.	No.	No.
No. 44. S. R. Dr. Hartwell, Lincoln.	48	M.	Carcinoma.	Old fistula. Puru- lent discharge and bleeding for several months.	Ulcerating tumor from anus up for 3 inches, sur- rounding whole rectum.	Yes. Marked.	Complete by in- termuscular method under rectal sheath. Distal end in primary wound.
No. 45. J. E. Dr. Adrian Lam- bert, Lincoln.	37	M.	Carcinoma.	Pain in lower ab- domen and in- creasing consti- pation for 15 months. Bleed- ing only 1 month.	Constricting mass 3 inches from anus. Hard, involving thickness of rectal wall.	Moder- ate.	Yes. Complete. Proximal end under anterior sheath of rec- tum. Distal end closed 8 days after rad- ical operation to control sep- sis below.
No. 46. M. D. Dr. Hartwell, Lincoln.	26	F.	Carcinoma.	Bleeding and pain for 2 years. In- terference with parturition. (?)	Complete rupture of perineum. Mass 2 inches from an- us, constricting bowel. Whole area badly in- fected.	Marked.	Complete by open meth- od 9 weeks prior to radi- cal operation.

## CASES—Concluded.

Type of Radical Operation.	Postoperative History.	Result and Time in Hospital.	Late Results.	Remarks.
Perineal route. Coccyx removed. Excision of rectum and mass. Wound closed. Metastatic glands removed from inguinal region.	Healing of wound apparently good. Colostomy open.	Discharged in 3 weeks, posterior wound having healed.	Alive now 10 weeks after operation, but has general return in pelvis. Colostomy wound gives only moderate control.	Only case reported in which inguinal glands showed involvement.
Sacral route. Resection from external sphincter to 1 inch above growth. End-to-end anastomosis.	Defecation through both ani. Sutures tore and end retracted 2 inches. Wound healed kindly by granulation.	Discharged in 4 months. Bowels moving equally by both paths. No control. Only small sinus leading to sacral end.	Alive and well at present, 3½ years after operation. Fair control through colostomy anus, the sacral wound and anus having closed spontaneously.	Note long period of no recurrence after narrow margin of healthy gut resected; also failure of any function in retained anal sphincter.
Sacral route. Resection 3 inches of bowel without disturbing sphincter. End-to-end sutured.	Marked fecal fouling of wound, with sloughing and separation of line of union. No general sepsis.	Still in hospital 3 months after operation. Has involuntary movements through both routes.	No recurrence, but local conditions only slowly improving.	Note lack of union and fouling of wound because lateral colostomy does not deflect all feces.
Sacral route. Amputation of 6 inches of gut. Proximal end sutured in upper angle wound.	Good healing of wound, but constant soiling by feces.	Discharged in 7 weeks with absolute incontinence.	No recurrence at present, 5 months after operation; sinus persists; no control over defecation.	Patient threatens suicide.
Sacral route. 5 inches amputated, end closed, and dropped into wound.	Distal end open and bowels move through both ani. Wound became fouled and suppurated rather freely. This stopped after complete colostomy was performed 3 months later and healed. There was moderate sepsis.	Discharged after 6 months. Sacral wound healed. Colostomy wound giving very fair control, unless with diarrhoea.	At present, 9 months after radical operation, is in excellent health. Very satisfactory control over inguinal anus.	Note inadequacy of lateral colostomy and rapid healing after complete colostomy.
Kraske. Resection of 3½ inches of gut. End-to-end suture. Sphincter divided, but retained.	Wound healed with moderate sepsis. Some tearing of sutures.	Discharged in 5 months, with wound healed and fair fecal control.	Remained in good condition for 2 years. Then recurrence locally; died three years after radical operation.	Condition gained markedly after colostomy.
Perineal route. Amputation of 6 inches of rectum. Proximal end sutured in superior angle wound.	Marked fouling of wound. Separation and retraction of rectum. Rather severe sepsis.	Still in hospital 1 month after operation. Incontinence. Wound healing.	.....	.....
Sacral route. Amputation of about 8 inches of gut. Closure lower end of bowel.	No infection in wound.	Died on eighth day from general loss of strength. Wound clean.	Had very fair control over colostomy during 3 weeks after wound healed.	.....
Perineal route. Sphincter split, 6 inches excised. Upper end brought down and sutured through sphincter. Wound partly closed.	Sutures in gut gave way. Gut retracted 2 inches. Wound became fouled and suppurated. Wound gaped. Severe sepsis resulted. Wound healed rapidly by granulation after colostomy.	Discharged with posterior wound nearly healed in 3 months. Fair control over colostomy movements.	Present time, 5 months after operation, in excellent health, working as engineer. Colostomy after removing skin constriction a month ago gives excellent control over movement.	Note failure of union of gut at skin margin; also rapid gain after colostomy.
Sacral route. Amputation of 6 inches of gut and posterior vaginal wall. End left attached in depth of wound.	Long course of chronic sepsis. Wound healed slowly. Marked gain in general condition.	Discharged in 3 months, with posterior wound nearly healed except at upper margin, where cervix uteri projects through.	In good health at present after 11 months. Colostomy gives very good control, permitting her to attend to household work without trouble. Cervix still presenting in wound.	Note good control in simple colostomy.

than one, 5 cases, or 11 per cent. (Two in this class may have died from intercurrent disease.)

Died from recurrence in less than three years and more than two, 4 cases, or 9 per cent., and 2 cases in this period who are suffering from extensive recurrence with extreme cachexia, raising the probable per cent. of recurrence death in this class to 13 per cent.

Living more than 3 years: 1 case 9 years, 8 months; 1 case 4 years, 6 months; 2 cases 3 years, 6 months; 1 case 3 years, 2 months. A total of 5.

Living less than 3 years and more than 2, 1 case.

Living less than 2 years and more than 1, 1 case.

Living less than 1 year, 8 cases.

Estimating that one-fifth of these ten cases who have lived less than three years will reach that limit, there are 2 cases to add to the 5 already past that time. Thus, 7 cases based on 44 (2 could not be traced) give the per cent. of estimated cures at 16.

The complete colostomy is a satisfactory method of preventing sepsis, and thus lowering the operative mortality.

Done by the intermuscular method and beneath the rectus sheath, the colostomy gives a better control than does the impaired retained sphincter in most cases.

For complete eradication of the disease, the rectum from above the growth to and including the anus must be sacrificed.

An earlier diagnosis is possible in most cases and will tend to improvement of final results.